Pacific Seabird Group

BULLETIN

Volume 12 Number 1 1985

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PACIFIC SEABIRD GROUP
BULLETIN

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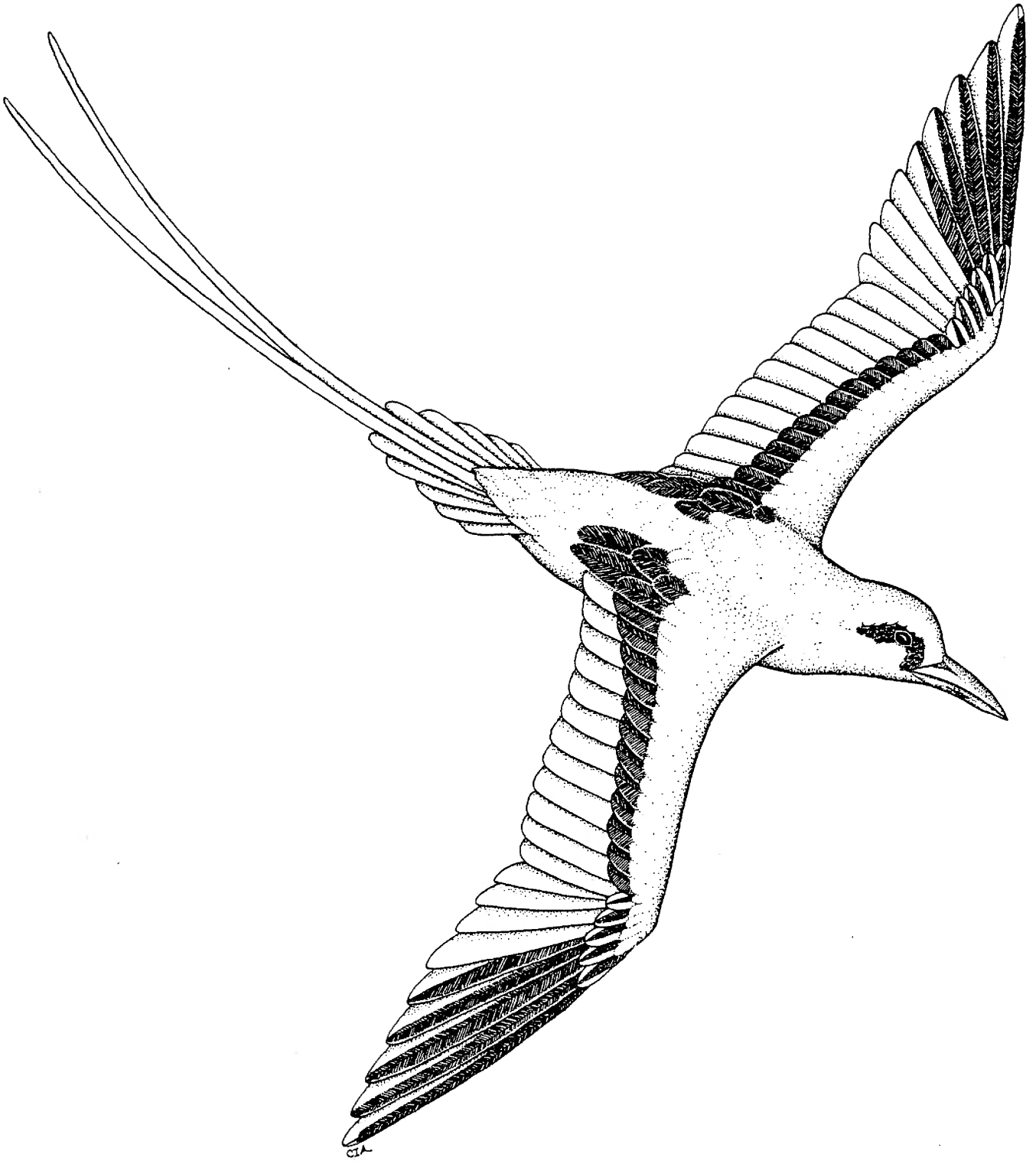
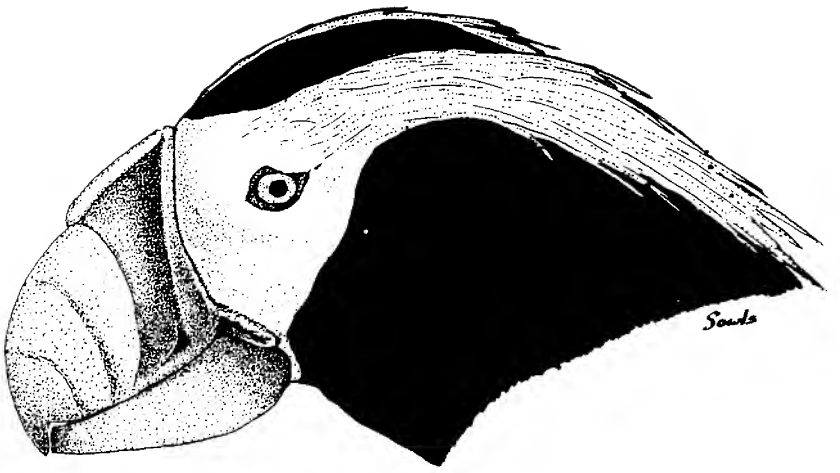




THE EDITOR'S PAGE

It is with a mixture of regret and relief that I write my last Editor's page. The feeling is not unlike that of fledging one's children.

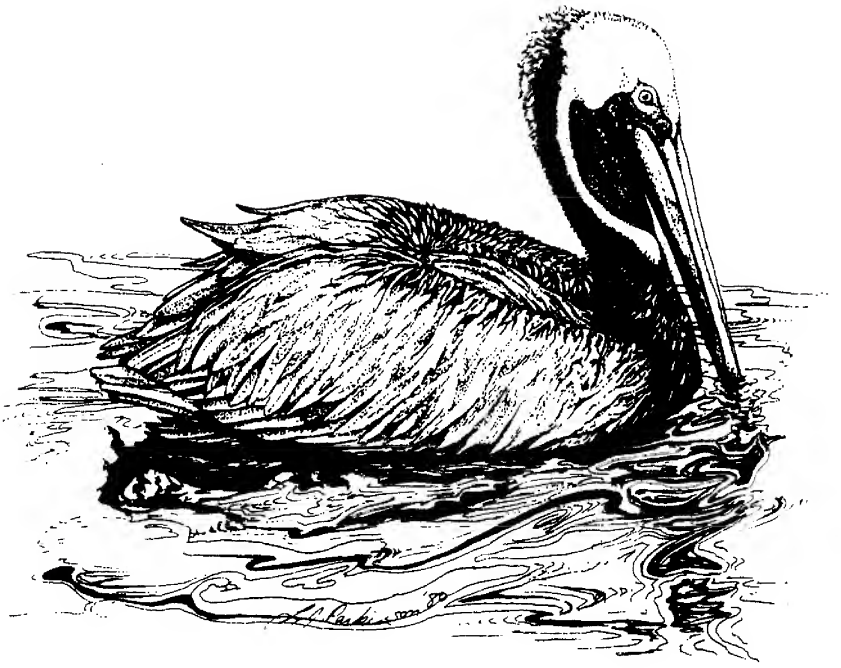
I have frequently grouched from this platform about the discrepancy I saw between what PSG proclaimed it wanted to do and what it actually did. The discussions at recent Executive Council meetings and recent actions of the officers indicate to me that there is a new commitment to getting things done. I'd like to think I had something to do with that.

I welcome Malcolm C. Coulter as the new Editor of the PSG Bulletin. He has taken on an increased task, since the printing and mailing of the Bulletin will now also be the Editor's responsibility. With PSG's becoming more active in several areas, it becomes increasingly important that all the members help the Editor as much as they can. Keep him up to date on local happenings and issues. Send him news items, announcements of meetings and new publications, and any other items you think should be published in the Bulletin. Most important, let him know what's on your mind concerning PSG affairs.

I thank all of the PSG members and others who have helped me over the last several years. Without your support and contributions I could never have done the job. I have greatly enjoyed working with all of the Chairs (Schreiber, Vermeer, Ohlendorf, Harrison, Hand, and Anderson) while I've been Editor and admire their dedication and hard work for PSG. Special thanks are due Doug Siegel-Causey and Paul Springer for help on countless details. I thank all of the many Regional Representatives who have acted as PSG's eyes and ears and submitted so many valuable reports.

A final thanks to the Boulder team, Esther Goodyear and Betsy Strauch. Their sharp eyes and high standards have contributed greatly to the quality of the Bulletin.

Thanks to everyone. I've never worked with a better bunch of people.



THE CHAIR'S PAGE

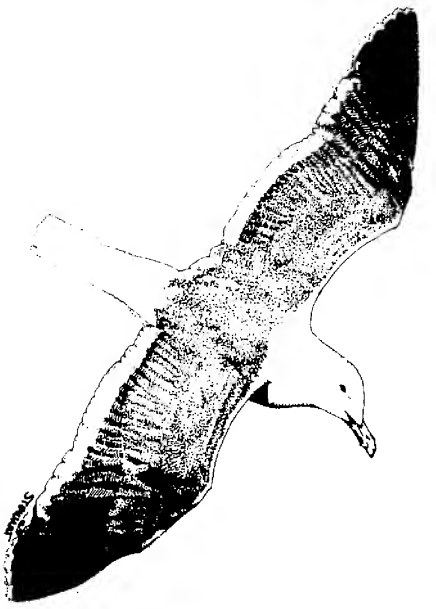
It seems like I've been here before. Yet, I come into a position and organization that has grown and survived—pretty much as we originally intended it.

I think the most important immediate issue of interest—and always a critical problem when the time comes—is finding an Editor for the PSG Bulletin. We are over that hump again, and Malcolm Coulter has agreed to take over from Joe Strauch, who is ending a distinguished and dedicated tour of duty. I want specially to thank Joe again, as his service to PSG has been truly outstanding. We all look forward to working with Malcolm, and I thank him for offering his service; yet his success will depend on the active participation and cooperation of our officers, committees, and members.

More good news. Our meetings will diversify greatly in the next two years. This is not to mean that our original philosophy of smallness and autonomy has been compromised. What it does mean is that our scientific productivity is healthy. Our San Francisco meeting means that we are going to establish closer coordination with a group doing the same things we are, the Colonial Waterbird Group. There will be two special symposia at that meeting. The meeting after that, in La Paz, Baja California, will be an attempt to interest Pacific researchers especially, but any researchers in Mexico, Central, and South America, in more active involvement in the PSG. It is possible some of our members with unusual agency travel restrictions may be hindered from attending such a meeting. This really only means that those people have to begin planning now—for we don't want to lose you. Fortunately, costs will be no more, and likely much less, than a meeting in California. There are many ways PSG can pull this off if everybody starts thinking "La Paz." PSG has always been an international organization.

Judith Hand pointed out at our last business meeting that the Chair's correspondence file has grown thicker and thicker. I hope that in 1985 it grows a bit thinner, but that can come about only if the entire membership keeps active, keeps the Editor, the officers, committee chairs, and the Regional Representatives informed and up to date. I look forward to a steady year in PSG.

Daniel W. Anderson



PACIFIC SEABIRD GROUP NEWS

1985 Joint Annual Meetings of the Pacific Seabird Group and Colonial Waterbird Group

A joint meeting of PSG and CWG will be held 4-8 December 1985 at the San Franciscan Hotel, San Francisco, California. Two symposia will be held, "Recent Advances in Gull Research" and "The Use of Man-modified vs. Natural Wetlands by Waterbirds and Shorebirds." Scientific paper sessions will be held 5-7 December, with field trips on the 8th.

For information about the meeting contact program chairs: Ms. Lora Leschner (PSG), Washington Dept. Game, 16018 Mill Creek Blvd., Mill Creek, WA 98012, (206) 774-8812; or Dr. William Southern (CWG), Northern Illinois Univ., Dept. Biological Sciences, DeKalb, IL 60115, (815) 753-7140.

1986 Annual Meeting

La Paz, Mexico, has tentatively been chosen for the Pacific Seabird Group's 1986 meeting location. The Executive Council is considering committee meetings in San Diego followed by a charter-bus field trip through Baja to the meeting in La Paz. Members who wish to participate in arrangements for this meeting should contact Dan Anderson or Lora Leschner.

PSG Membership Drive

PSG is trying to expand its membership into countries outside of our normal circulation areas. We intend to mail courtesy copies of the *PSG Bulletin* and membership brochures to individuals or organizations who represent potential new memberships and/or interested seabird workers in areas where our members presently are not found. We also intend to inform other people of our activities by sending courtesy copies of the Bulletin to individuals or organizations who for some reason cannot pay normal dues or subscription fees. We therefore solicit from our membership suggestions and especially names of people who fit these categories, i.e., new dues-paying members and new contacts. Please help by contacting our Secretary, Tony DeGange (address on inside back cover).

Inland Region

In listing the states and provinces included in the new Inland Region, the Editor neglected to include Alberta, Saskatchewan, and Manitoba.

Proposed Minutes of the Pacific Seabird Group Executive Council Meeting, 13 December 1984.

1. *Quorum Present*: Judith Hand called the Executive Council Meeting to order at 3:00 p.m. at the Hyatt Regency Hotel, Long Beach, California. Executive Council members present were Judith Hand, Dan Anderson, Gary Kaiser, Stewart Fefer, Enriqueta Velarde, Bob Boekelheide, Palmer Sekora, Jeff Froke, and Ken Briggs. Hand held proxies for Doug Siegel-Causey and Joe Strauch. Lora Leschner held proxy for Dee Boersma. DeGange held proxy for Sue Quinlan, and Doug Forsell voted as Alaska Representative.

2. *Minutes of Previous Meeting*: DeGange summarized the minutes from the 10th Executive Council Meeting and they were unanimously approved.

3. *Treasurer's Report*: Judith Hand read the Treasurer's report for Doug Siegel-Causey, who was unable to attend. The general fund at year's end stood at $1,730.00. Major expenditures for the preceeding year were $4,000.00 for publication of the Tropical Seabird Symposium, $498.00 for office expenses, and $200.00 for miscellaneous expenses. Hand anticipated that an additional $3,000.00 will be generated from dues, and fees from the registration and banquet. The endowment fund now stands at $5,000.00 and is invested in a money market account at 10% interest. Hand and Siegel-Causey wrote a cordial letter to delinquent members urging that they rejoin PSG. Ten percent of those contacted did so and the remainder were purged from the PSG membership list. The PSG membership now stands at 380.

4. *Election Results*: Stewart Fefer, Election Committee Chair, reported on the election results: Lora Leschner was elected as Chair-Elect and Tony DeGange was elected Secretary. New Regional Representatives are Ed Murphy, Alaska; Steve Speich, Washington; Tom Harvey, Northern California; Stewart Fefer, Hawaii; and Enriqueta Velarde, Mexico.

   Ballot results for changes to the bylaws were as follows:
   1) That the past three Chairs be included on the Executive Council—passed 107 to 4.
   2) That the bylaws be reworded to eliminate references to gender—passed 109 to 2.
   3) That the Regional Representative system be altered to reflect the wider perspective of PSG members and that 1 Representative be elected from each of the following 11 regions: 1) Alaska; 2) British Columbia and Washington; 3) Oregon and Northern California (Zip Codes 954, 955 and 959-961); 4) Central California (Zip Codes 940-953 and 956-958); 5) Southern California (no change from current area); 6) Hawaii, Asia, and South Pacific; 7) Latin America; 8) maritime Canada, New England, and Europe; 9) remainder of the U.S. east coast states, Gulf of Mexico states, and Africa; 10) U.S. states and Canadian provinces bordering the Great Lakes, and 11) inland states and provinces-passed 84 to 25.

   The new positions will be effective at the next Executive Council meeting. In the event that no one is nominated from those far afield regions, the Chair of PSG can nominate individuals from other regions.

5. *Chair's Report*: Hand reported that she, with input from Regional Representatives, responded to several conservation issues affecting seabirds. Notable among these were cobalt mining in Hawaii, the proposal to build a bullet train along the coast near Camp Pendleton, and leasing of offshore lands at Point Gorda in Oregon. PSG also provided input into refuge plans for the Hawaii Islands National Wildlife Refuge.

   Ron Naveen, one of two PSG Representatives to the ICBP, attended all the U.S. section meetings. He said, via a letter to Hand, that seabirds do not dominate the topics at the section meetings but recommended that PSG maintain its presence there. On the positive side, Naveen learned that there will soon be legislation banning gillnetting from Monterey Bay. Bill Drury, the other PSG Representative, was unable to attend most meetings due to financial constraints and must step down. Chair-Elect Dan Anderson will have to find someone to replace Drury in the coming year.

   The symposia on seabird feeding ecology and fisheries relationships, and the symposium on tropical seabirds are available and reflect well on PSG. In addition, the membership directory of seabird groups of the world was sent to members.

6. *Standing Committee Reports*: Seabird-Fisheries Interaction Committee—Chair George Hunt was absent, but in a letter to Hand he stated that he wished to resign the Chair. Hunt further stated that he had received no input from PSG members and recommended the committee be abolished. Hand said that the PSG membership does not seem suited for such committees and instead the committee should act as an informational group, i.e., seek out information and present it to the members in the Bulletin. Anderson *MOVED* that the Seabird-Fisheries Interaction Committee should summarize information on seabird-fisheries interactions so that the Conservation Committee could respond appropriately. Forsell *SECONDED* and the motion *PASSED*. Anderson *AMENDED* the motion to read that the incoming chair of PSG seek to find a person to act as chair of the Seabird-Fisheries Interaction Committee with the committee's primary purpose being to seek and summarize information on seabird-fisheries interactions and present it to the members via the Bulletin, and that if a person could not be found to chair the committee, the committee be abolished. The amended motion was *SECONDED* and *PASSED*. The general feeling was that the Seabird-Fisheries Interaction Committee could serve a useful function and therefore should be retained if possible.

   Translation Committee—Only Siegel-Causey is active on this committee. In a letter to Hand, Siegel-Causey reported that the AOU translation committee, of which he is a member, is doing the same work as the PSG committee and recommended the latter committee be abolished. Froke *MOVED* that the committee be retained and ally itself with the AOU translation committee and submit appropriate material on seabirds to the PSG Bulletin. Forsell *SECONDED* the motion and the *MOTION PASSED*.

   Conservation Committee—Kees Vermeer, the Chair, said that the report of the Conservation Committee would be out in the next Bulletin. Vermeer stated that Stephen Kress, the Conservation Committee Chair of the Colonial Waterbird Group, and he have joined each other's organizations and hope to work together on issues of mutual concern.

7. *Information Brochure*: Hand presented the second draft of the PSG information brochure put together by Sue Quinlan. It was decided that since use of color photos will increase printing costs by $600-$1,000, line drawings and/or black-and-white photos will be used;

however, the brochure will be printed on high quality paper with three or four colors. A discussion followed regarding the membership categories listed in the brochure: $10—Regular; $25—Contributing; $100—Supporting; $300—Life, and $1,000—Patron. It was felt that having several membership categories would give individuals a choice and potentially raise more money for PSG, although most will join at the $10 level. It was also suggested that the Regular membership level be increased. Hand responded, however, that the Regular membership level was not originally designed as a fund raiser and now more costly membership levels are available to those who wish to contribute more. Fefer *MOVED* that the membership levels be accepted as presented in the brochure. Briggs *SECONDED* the motion and the *MOTION PASSED*.

All funds generated from Life and Patron memberships will be put into the endowment fund. Forsell wondered if the general fund would suffer if many people join at these levels. DeGange *MOVED* that response to the various membership levels be monitored for one or two years after publication of the brochure and if a problem arises, appropriate action be taken at the annual meeting. The motion was *SECONDED* and *PASSED*.

Sue Quinlan, via Hand, presented cost estimates for printing the brochure in Fairbanks, Alaska, of $920 per 1,000 and $1,200 per 5,000. Since the brochure will be printed in California, printing will probably cost less than the Alaskan estimates. Sekora *MOVED* that PSG proceed with printing of the brochure using three or four colors on the outside and two colors on the inside at a cost not to exceed $1,200 per 5,000. Froke *SECONDED* the motion. The motion *PASSED* unanimously.

8. *Pamphlet on Human Disturbance*: Vermeer reported that the pamphlet on human disturbance at seabird colonies never got off the ground primarily because of confusion over who was in charge. Vermeer stated that at present there is no timetable for the document and that the Conservation Committee would wait for the ICBP status bulletin to appear for background material.

9. *Procedure for Handling Conservation Issues*: Despite published guidelines in the Bulletin on how to handle conservation issues, there still was considerable confusion on proper procedures. In fact, one Regional Representative responded for PSG on several issues without contacting the Chair. Hand reminded council members that if an appropriate issue surfaces, then PSG members should contact the member of the Conservation Committee in their region and, with a third person, draft a response and send it, double-spaced, to the Chair. The Chair will retype the letter and send it with his or her signature on it. Hand stressed that such letters must come from the PSG Chair. If a particular issue is of national importance or very controversial, then it should be brought before the Executive Council by the Conservation Committee Chair for approval.

10. *Future Meeting and Symposia*: The next meeting will be the first joint Pacific Seabird Group - Colonial Waterbird Group gathering and will be held at the San Franciscan Hotel in San Francisco. Michael Irwin, in a letter to Hand, proposed that the respective Executive Council meetings be held Thursday morning with papers following on Thursday afternoon and continuing through Saturday. He was concerned that many CWG members would arrive too late Wednesday to have a meeting. Hand suggested that it would be better to have the council meetings Wednesday afternoon and have three full days for papers. The social gathering could be held Thursday evening. Anderson suggested that PSG hold its council meeting Wednesday afternoon and have the social gathering Wednesday evening. CWG could hold its council meeting Thursday evening.

Anderson reported that the joint PSG-CWG meeting may have two symposia, one on birds in man-altered wetlands vs. natural wetlands and one on gulls. A CWG member who was interested in chairing the wetland symposium was insistent on its being the only symposium despite the wishes of the majority of CWG council members. Donald McKrimmon suggested that the chairs of each group seek co-chairs for the wetlands symposium. DeGange *MOVED* that both symposia be included in next year's joint meeting and that the incoming chair work to find organizers for the wetlands symposium. Anderson *SECONDED* the motion and it *PASSED*. Organizers for the gull symposium have already begun to contact possible participants.

Boekelheide reported that the San Franciscan Hotel, the site of the 1985 joint PSG-CWG meeting, is not as opulent as the Hyatt Regency in Long Beach but is adequate for our needs. The hotel is located in downtown San Francisco and has free parking. The management is eager for our business and has thrown in an extra suite for social gatherings. There is no charge for the meeting room.

Locations suggested by council members for the 1986 and 1987 meetings included Alaska; Portland; Asilomar; La Paz, Mexico; and Vancouver. Anderson reported that he had received an invitation from Juan Guzman to hold a meeting at the University of Southern Baja in La Paz. Anderson *MOVED* that the 1986 annual meeting of PSG be held in La Paz, Mexico. Forsell *SECONDED* the motion and it *PASSED*. The council decided that the 1987 meeting will be held in Portland, Asilomar, or Seattle.

11. *PSG Historian*: Hand suggested that PSG needs a historian to consolidate documents produced by members of the PSG such as symposia, bulletins, and correspondence from past chairs. In addition, the historian could ensure that photos be taken at each annual meeting to chart the history of the organization. At present the materials are scattered from the Los Angeles County Museum to Joe Strauch's home in Colorado. Fefer *MOVED* that someone be appointed historian of PSG with the responsibility of ensuring all PSG documents are properly archived in one place. Boekelheide *SECONDED* the motion. The *MOTION PASSED* unanimously. A lively discussion followed on who should be appointed historian. George Divoky subsequently accepted the position when asked by Hand.

12. *Investing Trustees*: Hand reminded the council that the endowment fund is to be managed by three investing trustees for terms of three years, one of whom will be the present Treasurer, Douglas Siegel-Causey. She stated that both she and Craig Harrison were willing to act as investing trustees. Fefer *MOVED* to have Judith Hand and Craig Harrison appointed as investing trustees of the PSG endowment fund for a period of three years. Boekelheide *SECONDED* the motion and it *PASSED* unanimously.

13. *Fund-Raising Committee*: Hand reported that a 10-year goal of the fund-raising committee might be to raise $100,000 for the endowment fund (only 10 Patron members per year). A meeting of the fund-raising committee will take place after the business meeting.

14. *Computerization of PSG Membership List*: Siegel-Causey has successfully completed this task. Siegel-Causey will be able to send each Regional Representative a list of members in her/his region. Another outcome of this task is that appropriate ballots might be sent out so members don't vote for reps outside of their region.

15. *Standardization of Regional Representatives' Reports*: It was suggested that the reports of Regional Representatives be standardized. The council decided that the present system is working and to leave things up to the Editor of the Bulletin. If the Editor wants to make changes, he or she can draw up guidelines.

16. *Expansion of PSG Membership*: After publication of the PSG information brochure, copies of the brochure and perhaps complimentary copies of the Bulletin will be sent to appropriate ornithologists in hopes that they will join PSG. Anderson suggested that membership lists in addition to those published in the world's seabird group directory be used. Anderson and DeGange volunteered to draft a letter to appear in the Bulletin requesting from members names of individuals or organizations that may represent new members or new contacts. G. Kaiser pointed out that colleagues in a number of countries either cannot afford the annual membership dues or cannot use "hard" currency to pay; yet the goal of PSG is to further communication about seabird research. He suggested that PSG send gratis copies of the Bulletin to such individuals. One way suggested to pay for these gratis copies of the Bulletin is to include on the dues statement a sentence asking members if they wish to sponsor copies for a colleague. Gratis subscriptions of the Bulletin would then be sent to individuals or organizations sponsored by the PSG member.

    In a related matter, David Duffy, of the Percy Fitzpatrick Institute in South Africa, volunteered to translate into Spanish regional reports and related material from the Bulletin and distribute it to interested South American researchers. He is currently seeking funding for the project. The cost to PSG for translating will be nothing; however, PSG will agree to duplicate the translated material provided by Duffy and do the mailing. Hand is to inform Duffy that the Executive Council looks favorably on this idea and he can proceed to get funding.

17. *Change of Editor*: Hand related that Joe Strauch plans to step down as Editor of the Bulletin. Strauch has written a position description for the Editor and it was posted outside the meeting room.

18. *PSG Newsletter*: The pros and cons of PSG's producing a newsletter as well as a Bulletin were debated. The newsletter would be cheap to produce, timely, and could include lists of new members, lists of meetings, advertisements, etc. Disadvantages include the need for an associate editor as well as additional costs. The council agreed to table the subject for one year until a new Editor is in place.

19. *Election Committee*: Stewart Fefer stepped down as Chair of the Election Committee. Palmer Sekora volunteered to chair the committee for the following year.

20. *Advertising in the Bulletin*: The council was initially divided on whether or not to allow advertising in the Bulletin. The primary concerns were maintaining our tax-free status and level of professionalism. Sekora *MOVED* that the Pacific Seabird Group not accept advertisements in the Bulletin. Fefer *SECONDED* the motion and it *PASSED*.

21. *Support for Publication of the Tern Symposium*: PSG gave $4,000 to offset the price of the Tropical Seabird Symposium by $3.00 to PSG members. The Executive Council debated whether to offer monetary support for the Tern Symposium. Three suggestions were offered, keeping in mind that the general fund has only $1,730: 1) that we use the surplus money from registration and the banquet to buy copies of the symposium for registrants

only; 2) that we allocate funds to offset costs of publication and receive a reduced price for PSG members; and 3) that excess money from registration be placed in the general fund. Leschner *MOVED* that, provided there are sufficient funds left over from registration fees, such funds be used to provide registrants with a free copy of the Tern Symposium if it is published. Anderson *SECONDED* the motion and it *PASSED*.

22. *Attu Island Resolution*: DeGange submitted a resolution written by Ed Bailey of the Alaska Maritime National Wildlife Refuge in Homer, Alaska. The resolution *PASSED* with minor changes. It reads as follows:

RESOLUTION: DIVESTITURE OF ATTU ISLAND FROM THE ALASKA MARITIME NATIONAL WILDLIFE REFUGE

WHEREAS, Attu Island, located at the western end of the Aleutian Archipelago, was designated as part of the Aleutian Islands National Wildlife Refuge in 1913 and was incorporated into the Alaska Maritime National Wildlife Refuge and designated Wilderness with passage of the Alaska Lands Act in 1980; and

WHEREAS, the conveyance of Attu Island constitutes a loss of the second largest refuge-owned island (224,000 acres) in the Alaska Maritime Refuge; and

WHEREAS, because of its proximity to Asia, Attu Island's flora is among the most diverse and unique in the Aleutians, and over 180 species of birds have been identified, including 60 Asiatic species, some of which are found nowhere else in North America; and

WHEREAS, over 100,000 seabirds nest on Attu or surrounding islets, including Alaska's largest cormorant colonies;

THEREFORE, BE IT RESOLVED that the Pacific Seabird Group strongly opposes the relinquishment of Attu Island as part of the Alaska Maritime National Wildlife Refuge.

23. *Check Negotiation*: Since PSG is now incorporated, Hand entertained the following motion, required by law, concerning who may negotiate checks or drafts against the funds of this corporation: "Resolved that the President and Treasurer of the Pacific Seabird Group be authorized in the name of the Pacific Seabird Group to negotiate checks or drafts against the funds of this corporation on deposit in the University State Bank, Lawrence, Kansas." It was so *MOVED* and *SECONDED*. The motion *PASSED*.

24. *Thanks*: Anderson moved that the following individuals be commended for their fine work on behalf of PSG:
Joe Strauch - Bulletin Editor
Judith Hand - Outgoing Chair
Sue Quinlan - Outgoing Secretary
Douglas Siegel-Causey - for putting together papers on incorporation
Stewart Fefer - Outgoing Chair of the Election Committee
Charlie Collins - Chair for the local committee
The motion was *SECONDED* and *PASSED* unanimously.

Lora Leschner *MOVED* to adjourn at 7:45 p.m. The motion was *SECONDED* and *PASSED* unanimously.

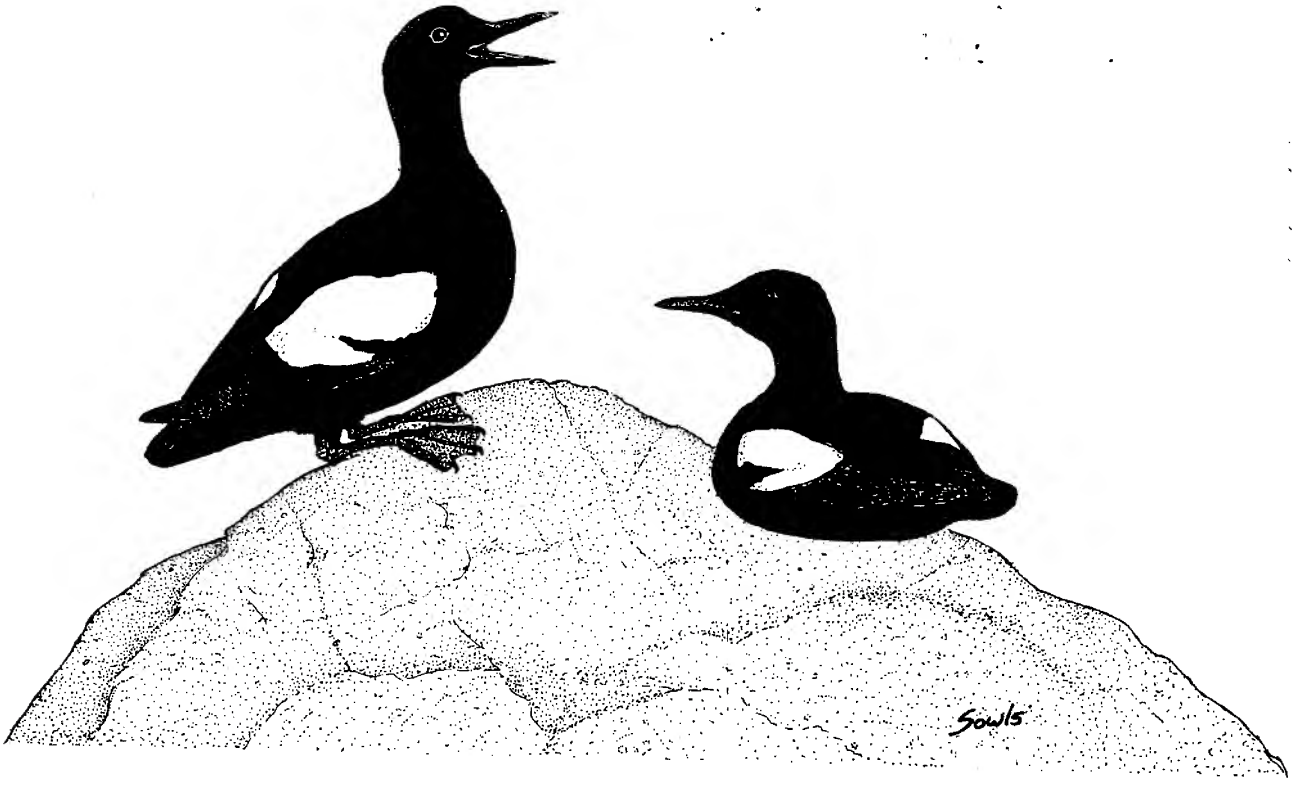
Respectfully submitted,
Tony DeGange, Secretary

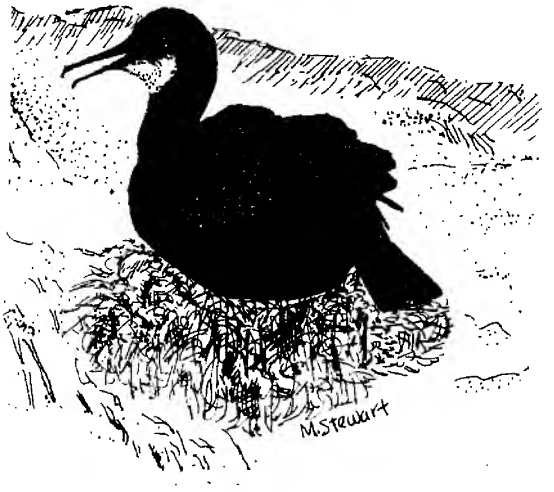
Deadlines for the Next Bulletin

The deadline for all copy for the next issue of the Bulletin is 15 June 1985. All contributions should be sent to the new Editor:

Dr. Malcolm C. Coulter
Savannah River Ecology Laboratory
P.O. Drawer 'E'
Aiken, SC 29802

All information on conservation should be sent to the Chair of the Conservation Committee (Dr. Kees Vermeer, Inst. Ocean Sci., P.O. Box 6000, Sidney, BC V8L 4B2, Canada) no later than 15 May 1985.





THE PROGRAM CHAIR'S COMMENTS
ELEVENTH ANNUAL MEETING
Long Beach, California
13-16 December 1984
Daniel W. Anderson

A significant tradition of PSG has been to welcome and encourage symposia on specialized topics, and 1984 was no exception. Papers submitted to these symposia all receive standard, journal-quality peer review if they are to be published. It is hoped that 1984's symposia will result in another publication in that tradition. We must remember that the unpublished papers represent in many cases, preliminary data, perhaps untested hypotheses or ideas, status summaries, techniques reports, etc. Their purposes are many; information exchange is the most important. It has been such free information exchange that has always characterized our scientific papers sessions, and 1984 accomplished that.

The participants, the session chairpersons, and the local committee on arrangements all deserve special thanks. Our special symposium Chair, Barbara Massey, gets Patience Award No. I for holding up despite an unexpected brownout halfway through her session. Jonathan Atwood also chaired a session on terns. Our general session chairs, in order of appearance, were David Ainley, Michael Fry, Lora Leschner, George Divoky, Kenneth Briggs, and Judith Hand. Lora Leschner gets Patience Award No. II. I am not sure how many times her talk was rescheduled. Our local committee, Charles Collins, Stuart Warter, Massey, Atwood, and D. Minsky, all helped to keep things going smoothly.

ABSTRACTS

STATUS, DISPERSION, AND POPULATION CHANGES OF THE LEAST TERN IN COASTAL MISSISSIPPI

Jackson, Jerome A., and Bette J. Schardien Jackson. Dept. Biological Sciences, Mississippi State Univ., Mississippi State, MS 39762

Least Terns (*Sterna antillarum*) have been known from the northern Gulf Coast since the 1600's. Early breeding records for coastal Mississippi refer to small populations on the natural mainland beach and barrier islands. Increasing human developments and the construction and maintenance of a seawall and man-made beach greatly reduced nesting activities on the mainland through the 1950's and 1960's. By the mid-1970's conservation efforts resulted in protection of mainland colonies, and construction of a spoil island near the natural barrier islands provided a nesting area for the barrier island populations that was free of the threat of raccoon (*Procyon lotor*) predation. Colonies have fluctuated in numbers in recent years and have suffered losses to human pollution and encroachment, but seem at an all-time high. One mainland population has included 3000+ nests in recent years; other nests have been found on flat rooftops.

DISTRIBUTION, ABUNDANCE, AND SITE FIDELITY OF THE INLAND LEAST TERN IN KANSAS AND NORTHERN OKLAHOMA

Boyd, Roger K. Biology Dept., Baker Univ., Baldwin City, KS 66006

The Inland Least Tern (*Sterna antillarum athalassos*) has historically nested on several rivers and saltflats in Kansas and Oklahoma. During 1980-84, as part of the Kansas Non-Game Wildlife Project, I studied various aspects of the breeding biology and population dynamics of Least Terns in Kansas and Oklahoma. Colonies were visited throughout the breeding season to assess reproductive success and to capture and color band adults and juveniles.

Colonies were consistently located in three areas: Quivira National Wildlife Refuge, Salt Plains NWR, and along the Cimarron River between Meade Co., Kansas, and Woods Co., Oklahoma. Other breeding or sight records in both Kansas and Oklahoma will be noted. These are the numbers of breeding adults at each of the principal locations: Quivira NWR, 40-50; Salt Plains NWR, 180-240 (Hill, unpub. data); Woods Co., Oklahoma, 35-40; Clark Co., Kansas, 10-25; Harper Co., Oklahoma, 35-40; Beaver Co., Oklahoma, 15-26; Meade Co., Kansas, 25-30.

Movements between colonies occurred only along the Cimarron River, and even there movements were very limited. Site fidelity of adults between years was fairly high. The return of birds banded as juveniles will be discussed, including a breeding adult captured at Quivira NWR in 1984 that was banded as a chick on the Texas coast in 1980.

NEST SITE SELECTION IN LEAST TERNS

Burger, Joanna, and Michael Gochfeld. Dept. Biological Sciences, Rutgers Univ., Piscataway, NJ 08854; UMDNJ-Rutgers Medical School, Dept. Environmental and Community Medicine, Piscataway, NJ 08854

We studied nest site selection in Least Tern colonies in New York and New Jersey to examine individual nest site selection within colonies. Their choice of nest sites differed from random with respect to location, elevation, shell cover, and distance to vegetation. Terns preferred to nest in the middle third of the beach on ridges rather than on troughs or flat areas. Their choice of nest site

related to predator avoidance, as mammalian predators were the primary cause of nest failure. Foxes and cats entered from the dunes and preyed heavily on nests adjacent to the dunes. It is particularly important to know what characteristics this species selects for nest sites, since several states are attempting management and creation of Least Tern nesting habitats.

SITE FIDELITY AND REGIONAL PHILOPATRY IN THE LEAST TERN

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Since being given federal and state endangered species status in 1973, the California Least Tern has been studied in some detail by various researchers. In addition to a brief overview of the progress made in the recovery effort and a summary of ongoing research projects, this paper presents detailed information on nest site tenacity and movements of Least Terns based on banding recoveries obtained during the last ten years.

Least Terns in California exhibit a high degree of tenacity to breeding colonies, and individuals may even nest in the same portion of a nesting site from year to year. There does not seem to be a pronounced tendency for birds to nest at their natal colonies; however, there is some degree of regional philopatry. Both of these results have important management implications, which are discussed.

CONSERVATION OF LITTLE TERNS IN BRITAIN AND IRELAND

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Two thousand one hundred pairs of Little Terns *Sterna albifrons* breed in Britain and Ireland, 36% of the population of northwest Europe. There has been an increase of around 15% in the last decade. Two-thirds breed in eastern and southern England, where human pressures are considerable, with a tendency towards larger colonies at fewer sites. Most colonies are within reserves or receive some degree of protection. The main threats are adverse weather, tidal flooding, human disturbance, and predation. Limited protection can be provided against high winds and blown sand, but there is more scope for practical conservation to reduce the effects of tidal flooding: various techniques are described. Outside reserves, some success has been achieved by marking colonies with notices and fencing, but human disturbance is best reduced through continuous wardening. Predation, especially by red foxes *Vulpes vulpes*, can be severe: various deterrents, particularly electric fences, have been tried. The need for predator control remains controversial. A Symposium of Little Terns was held in 1980 and a practical guide to their conservation was published in 1983. Current research includes continuous population monitoring, an almost complete census in 1984, and a color-banding program to identify colony interchange.

THE REPRODUCTIVE ECOLOGY AND POPULATION DYNAMICS OF ROSEATE TERNS ON FALKNER ISLAND, CONNECTICUT

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The breeding ecology and population dynamics of Roseate Terns (*Sterna dougallii*) have been studied intensively on Falkner Island, Connecticut, since 1981, following three years of a more general population study of both this species and the Common Terns (*S. hirundo*) that nest with them on this small (2-ha) island in Long Island Sound. Since 1978 we have trapped 911 adult

Roseate Terns on their nests. The birds nesting in naturally occurring or man-modified sheltered sites such as abandoned rabbit burrows, under large rocks or boards, or inside half-buried tires on the beach have had greater reproductive success and are more likely to nest in the same site or in a similar habitat the following year than birds nesting in vegetated areas or in more exposed sites on the beach. In this paper we also discuss the timing of nest initiation and reproductive success of known-age birds, nest site selection by birds whose natal habitat is known, the recruitment of new adults into the breeding population, the annual survival of adults, and the timing and causes of egg loss and chick mortality.

NESTING SUCCESS OF COMMON TERNS ON ARTIFICIAL SITES: RELEVANCE TO MANAGEMENT IN URBAN AREAS

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Near the city of Boston the few remaining natural nesting areas have high rat populations. Since about 1974 Common Terns (*Sterna hirundo*) have nested on dilapidated, abandoned piers. In early years many chicks fell off and fledging success was low. Repairs, modifications, and new structures enabled about 275 pairs to fledge 400 young in 1984. Design features of fixed and floating nesting sites are described. The terns preferred dead grass to sandy or pebbly substrates, but neither substrate type nor (artificial) shelter affected fledging success.

Artificial nesting sites can be effective aids for conservation of terns in urban areas. Information on additional examples is sought.

A COMPARISON OF NEST SITE SELECTION IN ROSEATE AND COMMON TERNS

Gochfeld, Michael, and Joanna Burger. Dept. Environmental and Community Medicine, UMDNJ-Rutgers Medical School; Biological Sciences, Rutgers Univ., Piscataway, NJ 08854

Nesting Roseate Terns associate with Common Terns in colonies in eastern North America. Comparisons of nest site characteristics and behavior reveal 1) clustering of Roseates among the more abundant Common Terns, 2) preference of Roseates for vegetative or other cover over the nest, 3) tolerance of Roseates for dense vegetation, 4) greater vulnerability to rat predation. Roseate Tern chicks, if undisturbed, will remain at the nest site throughout the prefledging period. Roseate nests under goldenrod are subject to defoliation by a host-specific beetle, causing nest failure or premature departure by the young. In other parts of the world Roseate Terns show no apparent preference for vegetative cover, nesting on barren coral cays and beaches. Occasional "open" colonies of Roseate Terns occur in the northeastern United States, and this apparent facultative habitat selection is discussed. The effect of reproductive failure as a modifier of nest site selection is examined.

CLEPTOPARASITIC BEHAVIOR OF HEERMANN'S GULLS (*Larus heermanni*) TOWARD ELEGANT TERNS (*Sterna elegans*) DURING THE BREEDING SEASON ON ISLA RASA, BAJA CALIFORNIA, MEXICO

Velarde, Enriqueta. Instituto de Biología, UNAM Apartado Postal 70-153, 04515 México, D.F.

Cleptoparasitism is common among several species of larids and may be a way of having access to food sources otherwise unavailable to them. Food-robbing behavior of Heermann's Gulls toward Elegant Terns was observed on Isla Rasa in 1980 and 1981. Two main types of search methods and areas of attack were observed: aerial and terrestrial. Number of gulls searching

and average individual search time were recorded. Number of individuals in an attack group, as well as numbers of groups formed per unit time, are reported for both air and land attacks. Number of gulls in an attack group and probability of different outcomes of a search are related.

SOME FEATURES OF THE REPRODUCTIVE STRATEGY OF THE ELEGANT TERN (*Sterna elegans*)

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Elegant Terns are highly gregarious birds that breed in mixed-species groups and lack any aggressive predator-mobbing behavior. Pair formation occurs away from the breeding colony, and Elegant Terns exhibit mass synchronous breeding. In most nesting groups the majority of pairs dig nest scrapes and lay eggs in one 24-hour period. Nest placement is extremely compact, and Elegant Terns exhibit a well-developed ability to recognize their own eggs, as demonstrated by egg-twinning experiments. There are differences in incubation and creche-joining times between nests of groups established early in the season and those of groups established late in the season, and between nests located centrally and nests located peripherally within a group. These and other features of the Elegant Tern's reproductive strategy can be explained in terms of both the nature of the breeding site and the nature of the food supply.

VEGETATION ASSESSMENT AND REPRODUCTIVE SUCCESS: WHAT DO DIFFERENT VEGETATION TYPES MEAN TO BLACK TERNS?

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Black Terns (*Chlidonias niger*) in the Creston Valley Wildlife Management Area, British Columbia, nest in three different types of vegetation. Black Terns nest in marshes, where they place their nest on water. They can lose 10-30% of their eggs to water-level fluctuation and/or wave action. Some pairs nest in stands of *Equisetum* and *Carex*, some in *Typha* and/or *Scirpus* stands, and most in *Phalaris*, reed-canary grass stands. Because of the terns' decline in reproductive success caused by water fluctuations, various vegetation characteristics were measured in an attempt to compare the different habitats. Important characteristics were vegetation type and density, compass orientation of the nest relative to the surrounding vegetation, and seasonal fluctuation of the water level.

PREY SWITCHING DURING REPRODUCTION IN A MAINLAND COLONY OF WESTERN GULLS

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Prey choice in a mainland colony of Western Gulls (*Larus occidentalis*) where food was locally abundant was investigated during the reproductive period from 1981 through 1983. No differences among years were found in type of prey taken during egg laying and incubation. However, significant differences were observed in numbers and type of prey taken during egg laying and incubation versus those taken during the chick period. Invertebrates (primarily *Hemigrapsus* sp.) were preferred during egg laying despite the occurrence of the fishes *Chilara taylori* and *Genyonemus lineatus* spawning nearby in Elkhorn Slough. As incubation commenced, gulls included these prey types more often but continued to feed on invertebrates as well. During the chick period Western Gulls fed chicks and mates primarily fish (90% of diet), although invertebrates remained plentiful. Fish species taken included *Porichthys notatus* and *Atherinops californiensis*,

which occurred in large numbers at this time. These data suggest that Western Gulls adjusted their diet by selecting highly caloric/nutritive prey to satisfy the energetic demands critical to important phases of the reproductive period.

FOOD BUDGETS OF CASSIN'S AUKLET CHICKS ON THE FARALLON ISLANDS, CALIFORNIA

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Cassin's Auklets feed at sea during the day and return to their nests once each day in the evening. Parents bring food to their young in gular pouches and feed their chicks at night. Except when they are very young, the chicks are alone during the day and remain inactive in their burrows. By weighing chicks before their parents returned in the evening, after the parents left in the morning, and throughout the day, we determined the amount of food consumed by the chicks and their weight loss due to metabolism and excretion. From these figures we determined the food budget of the chicks. Parents provided about 2,800 grams of food to raise each chick from 18 grams at hatching to 150 grams at fledging.

TERRESTRIAL AND MARINE PROTEIN IN THE DIETS OF WEST COAST LARIDS

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Measurement of the carbon 13-to-carbon 12 ratio of bone collagen can provide a quantitative estimate of the relative proportions of marine and terrestrial protein in the diet. This technique is of particular significance to dietary studies of seabirds that have access to terrestrial protein. The stable-carbon-isotope ratios of bone collagen have been measured for Glaucous-winged Gulls (*Larus glaucescens*) and California Gulls (*L. californicus*) from southwest British Columbia and for Western Gulls (*L. occidentalis*) from Southeast Farallon Island, California. These measurements indicate that in some individuals the minimum terrestrial-protein contribution to the diet may be as high as 60%. It is suggested that larid populations be calibrated so that long-term variation in diet can be monitored by this technique.

NICHE RELATIONSHIPS OF SEABIRDS IN INSHORE, MIXED-SPECIES FEEDING FLOCKS

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Barkley Sound is a major spawning ground for Pacific herring in British Columbia. Schools driven to the surface by predatory fishes create an ephemeral, superabundant food source used by postbreeding alcids, larids, and cormorants. A land-based study collected observations on 108 mixed-species feeding flocks between 11 June and 27 October 1983. Flock characteristics demonstrate that each species plays a unique role in these groups. Common Murres promote the concentration of prey items and enhance foraging by other species. While Marbled Murrelets have the ability to concentrate herring, they participate in the least persistent groups. California and Glaucous-winged gulls initiate a large portion of the feeding flocks and may limit the fishes' escape from the edges of the school. Pelagic Cormorants neither initiate flocks nor concentrate the prey.

RADIOTELEMETRY OF RHINOCEROS AUKLETS IN PUGET SOUND

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Fieldwork was conducted on and near Protection Island, Washington, from 4 July to 19 September 1984. Ten Rhinoceros Auklets were captured and fitted with 11-g radio transmitters. Two attachment methods were used: a backpack with a harness of pliable tygon tubing and a backpack epoxied directly to feathers on the back. An airplane was used to track radio-equipped birds.

Only one of the five harness-backpack auklets was relocated. Four of the five epoxy-backpack birds were relocated. These four birds were located on at least two flights and one was located on five flights. Radioed birds traveled 1 to 44 km from the island. We believe that the birds traveled even greater distances.

FIELD USE OF MICROCOMPUTERS FOR THE COLLECTION OF SEABIRD DATA

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A program for the acquisition of data on the distribution of pelagic birds was written for the Husky Hunter, a waterproof, hand-held microcomputer with a six-line screen. The full-screen, menu-driven program was designed to allow simple, real-time recording of bird codes and behaviors, as well as periodic updates of environmental data and ship's position at sea. In contrast to the previous practice of recording observations by hand on data sheets and later transcribing them to computer, this system allows the user to download data to a personal computer floppy disk for immediate analysis in the field. This system was field-tested successfully during a four-week cruise in the Bering Sea.

COMPARATIVE ANALYSIS OF ROCKY-SHORELINE WINTERING-BIRD DENSITIES

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Surveys were made of densities of rocky-shoreline birds from late 1969 to early 1973. These are compared to surveys made at the same site in Palos Verdes Estates, California, over a decade later. A versatile new technique called the bootstrap provides the basis for statistical inference in these comparisons and should prove to be widely applicable in avian survey research. This method allows us to answer the question: Are there any significant differences between the original and the current bird survey results?

ARTIFICIAL RHINOCEROS AUKLET BURROWS: A USEFUL TOOL FOR MANAGEMENT AND RESEARCH

Wilson, Ulrich W. U.S. Fish and Wildlife Service, Willapa National Wildlife Refuge, Ilwaco, WA 98624

Studies of burrowing alcids often require excavation of burrows for nest access. If carried out over many years, serious damage to the nesting environment can result. Because of the need

for methods that minimize such damage, I investigated the feasibility of using artificial burrows for studying Rhinoceros Auklets. Monitoring 20 artificial burrows on Protection Island, Washington, from 1980 through 1984 showed that Rhinoceros Auklets readily use such burrows for nesting. The percentage of artificial burrows producing chicks steadily increased from 50% in 1980 to 89% in 1984. Chick growth in artificial burrows appeared comparable to that of natural burrows. Breeders often used the burrows year after year. Use of artificial burrows thus may be employed in long-term studies, where habitat damage and efficiency in the field are of concern.

COLONIAL BIRD MONITORING: A STRATEGY FOR REGIONAL AND NATIONAL EVALUATION

McCrimmon, D. A. R. M. Erwin, P. H. Geissler, and M. L. Shaffer. Point Reyes Bird Observatory, Stinson Beach, CA 94970 (McCrimmon); U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD 20708 (Erwin and Geissler); U.S. Fish and Wildlife Service, Office of Migratory Bird Management, Washington, DC 20240

Through the recent expansion of many state nongame programs, more than 30 states have initiated colonial waterbird projects. In addition, several federal agencies and private organizations already have substantial data bases on colonial waterbirds. To reduce duplication and enhance utility of effort, we provide here (1) a summary of past monitoring efforts and objectives, (2) a review of methods used in the field collection and storage and retrieval of computerized data, and (3) recommendations for designing monitoring schemes. The design will depend largely on whether the objective is to detect population trends, monitor colony site changes over time, identify all nesting colonies, or monitor reproductive success. Past monitoring efforts are often biased because only sites which formerly supported colonies are visited.

A NATIONAL SUMMARY OF REGIONAL COLONIAL WATERBIRD SURVEYS

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A nationwide summary of coastal breeding populations of colonial waterbirds in the contiguous United States is in the final stages of completion. This work is based mainly on information gathered as part of the Coastal Ecosystems Project of the U.S. Fish and Wildlife Service's Division of Biological Services, and is published as a set of atlases of wading bird and seabird nesting colonies in the FWS/OBS publication series. For each species in this report, a summary table and map showing the abundance of breeding birds in the coastal, 1:250,000 scale, USGS base-map areas covering the Atlantic, Florida, Gulf, Pacific, and Great Lakes coasts have been prepared. The accompanying text provides a national overview of the pattern of distribution and abundance of colonial waterbirds nesting along the coastal regions of the United States. This paper discusses the format and some representative results of this work.

AVIFAUNA OF MARGARITA ISLAND, BAJA CALIFORNIA SUR, MEXICO

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Margarita Island is an important breeding ground for many birds and wintering area for migrants. It is located off the Pacific coast of Baja California (Lat. 24° 30′ N; Long. 111° 50′ W);

at its southeastern end there is a mangrove area (about 0.15 km^2). Fifty-eight species of sea and coastal birds were recorded between August 1980 and September 1984. Of these, 20 are residents, 26 migrants, and 12 are uncommon. The mangrove area is used as a breeding area by many thousands of *Fregata magnificens*, and to a lesser extent by *Phalacrocorax auritus*, *Egretta thula*, *E. caerulea*, *E. tricolor*, *E. rufescens*, *Nycticorax violaceus*, and *Eudocimus albus*. Considering this mangrove area as an important refuge for so many birds, we suggest making it a reserve. We plan further studies on the natural history and ecology of some of these species.

RHINOCEROS AUKLET BURROW CENSUS ON PROTECTION ISLAND, WASHINGTON

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Speich and Wahl (in press) have estimated that about 61,000 Rhinoceros Auklets (*Cerorhinca monocerata*) breed within Washington State's coastline. From 1 to 17 August 1983 we counted the number of Rhinoceros Auklet burrows on Protection Island, Washington. We used three methods: direct walking counts, line transects with quadrats, and counts from a boat. We estimated 27,059 burrows on Protection Island in 1983. We found a highly significant negative correlation ($r = -0.329$, 265 df, $p < 0.001$) when we compared burrow density (burrows/m^2) to the distance from the top of the slope. The total number of burrows has apparently changed very little since 1975/76 but distribution may have changed slightly. Causes for the shift in nesting areas were unknown.

MARINE BIRDS WINTERING IN KODIAK ISLAND BAYS: A FIVE-YEAR POPULATION STUDY

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Marine birds wintering in selected bays of Kodiak Island were censused in November and again in February from the fall of 1979 through the winter of 1984. Standard strip censuses were conducted from a 15-m ship crossing the bays from shore to shore in order to sample a variety of habitats on each transect. The numbers of most migratory species increased between the fall and winter surveys, indicating that birds are still moving into the bays in fall and that winter surveys are better for a monitoring program of marine birds. For all bays combined, the numbers of loons, Glaucous-winged Gulls, Mew Gulls, Black-legged Kittiwakes, Common Murres, and Crested Auklets were too variable to permit meaningful comparisons of wintering populations among years. Grebes, cormorants, goldeneyes, Harlequin Ducks, scoters, Oldsquaws, Pigeon Guillemots, and Marbled Murrelets, however, occurred in relatively consistent numbers, and we believe that their wintering populations can be monitored with future surveys.

MOVEMENTS AND NUMBERS OF ROSS' GULLS AT POINT BARROW, ALASKA

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The Ross' Gull is one of the few species regularly occurring in North America whose wintering grounds are still unknown. The only location where large numbers are regularly observed away from the Siberian breeding grounds is at Point Barrow, Alaska, where a major migration is visible from land in September and October. The northeasterly direction of the Point Barrow

passage has led to speculation that the species winters in the Arctic Basin. In September and October 1984 the first systematic observations of the fall migration at Point Barrow were conducted to obtain information on the direction and magnitude of the passage. The importance of the northeasterly movement is interpreted in light of recently obtained information on the biological productivity of the Beaufort and Chukchi seas. A minimum world population estimate is also presented.

RED-FOOTED BOOBY (*Sula sula*) IN ISLA ISABELA, NAYARIT, MEXICO

Cervantes-Calderon, Pablo. Universidad Nacional Autónoma de México

There were no reports of Red-footed Boobies in Isla Isabela, Nayarit, or the area for at least a decade. The only area in Mexico where this species was seen was the islands west of the Peninsula of Baja California, from where it probably moved toward Isabela.

Individuals of both brown and white morphs of the Red-footed Booby have been observed by several people on Isabela since 1981. In 1984 several breeding pairs were observed.

LONG-TERM RESPONSES OF BREEDING SEABIRDS TO OIL EXPOSURE

Fry, D. Michael, R. Boekelheide, J. Swenson, A. Kang, J. Young, and C. R. Grau. Dept. Avian Sciences, Univ. California, Davis; Point Reyes Bird Observatory, Stinson Beach, CA

A multiyear study of breeding birds exposed to a small quantity of oil has demonstrated reduction in breeding success and switching of breeding sites in a subsequent year. Breeding success of Wedge-tailed Shearwaters and Cassin's Auklets was reduced by external application of 0.1 to 2.0 ml weathered Santa Barbara crude oil. Abandonment and switching of burrows, and switching of mates were contributors to lowered success. Abandonment was more pronounced in marginal breeding habitat, and breeding failure in one year influenced mate fidelity and return to the same burrow in a subsequent year. The effects of oil appear to be complex, with disruption of breeding occurring as a consequence of the toxic effects plus additional indirect effects from disruption of pair bonds following breeding failure. This work was supported by USDI MMS Contract # 14-12-0001-29112/SB)408(a)-81-C-0509 awarded to Nero & Assoc., Portland, Oregon.

ORGANIC AND INORGANIC TOXICANTS IN RHINOCEROS AUKLETS FROM WASHINGTON

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Ten Rhinoceros Auklets were collected from Destruction Island on the Washington Coast and 10 from Protection Island in Puget Sound during the breeding season of 1980. Livers were analyzed for p.p'-DDE, PCB's, and other organics. The livers and kidneys of 10 birds were also analyzed for selected metals. Cadmium was detected in the kidneys of all 10 birds. Two birds from Protection Island had Cd concentrations greater than 15 μg/g wet weight. Mercury and lead were found at relatively low levels in most of the liver samples. PCB's were found in only a few samples, whereas p.p'-DDE was detected in all 20 birds. These baseline data are discussed in relationship to food chain transfer of pollutants in Puget Sound.

SEABIRD MORTALITY IN JAPANESE SALMON GILLNETS

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Seabird mortality in Japanese salmon gillnets was studied in 1982 and 1983. Twelve American observers collected mortality data from 271 gillnet sets in 1982 and 266 gillnet sets in 1983. The number of birds caught in each set varied from 1 to 191 in 1982 and 0 to 455 in 1983. Mortality of seabirds was lower in the Bering Sea compared to south of the Aleutian Chain, reflecting lower bird densities in the northern part of the study area. Over the entire study area, the mean number of birds caught per set increased from 22 birds per set in 1982 to 33 birds per set in 1983. Short-tailed Shearwaters accounted for almost all of this increase. Seabird mortality was negatively correlated with distance from land. Age and breeding composition of the kill as well as overall estimates of mortality are discussed.

EFFECTS OF INTRODUCED HERBIVOROUS MAMMALS ON INSULAR HABITAT AND SEABIRDS IN ALASKA

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Foxes were released on various islands for fur farming starting in about 1836 and reaching a peak in the 1920's. Ground squirrels, voles, hares, and marmots were introduced as an additional food supply for foxes. Foxes have since vanished or have been eradicated from many islands, but ground squirrels and other rodents remain and are causing severe habitat damage on some islands. Ground squirrels, voles, and rats also depredate eggs and chicks of fossorial seabirds; small alcids and hydrobatids generally are absent from islands infested with introduced rodents. The only small burrowing seabird found to coexist with low-density populations of ground squirrels is the Ancient Murrelet, perhaps because chicks leave burrows soon after hatching. Irruptions of voles and ground squirrels on certain islands result in serious erosion. Damage is most extensive off the Alaska Peninsula, the source of most introduced species. Cattle, reindeer, and other ungulates also have ravaged islands, particularly in conjunction with rodents.

THE BREEDING ECOLOGY OF CASSIN'S AUKLET: RESPONSES TO VARYING OCEANOGRAPHIC CLIMATE

Ainley, David G. and Robert J. Boekelheide. Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, CA 94970

The breeding ecology of Cassin's Auklet, a numerous, planktivorous seabird, was investigated annually at Southeast Farallon Island, California, from 1970 to 1984. In spite of the species' conservative life history strategy, breeding success, as measured by chicks fledged per nesting pair and fledging weight, and the timing of nesting varied widely from year to year. Success was notably poor during several years, including 1983, but equally notable were years during which success was especially good. Success varied according to the relative strengths of the California Current, the California Countercurrent, and coastal upwelling. Onset of the latter process was also important in triggering the annual reproductive effort.

ONE YEAR FOLLOWING EL NIÑO: HAVE FARALLON SEABIRDS RECOVERED?

Boekelheide, Robert J., David G. Ainley, Teya McElroy Penniman, Harry R. Carter, and Jay Penniman. Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, CA 94970

Prior to 1983, over a period of 12 years Point Reyes Bird Observatory witnessed 4 breeding seasons at the Farallon Islands with weak to moderate El Niño conditions, each typified by reduction in breeding effort and population sizes by various Farallon species. Each of these years was followed by years with favorable conditions and immediate restoration of population sizes to their former levels, suggesting that significant adult mortality had not occurred. Following the strong El Niño of 1983, however, several populations remained at depressed levels through the 1984 season, despite significant upwelling and apparent return of principal prey populations in 1984. Species showing greatest population reductions, Brandt's and Pelagic cormorants, Common Murres, and Pigeon Guillemots, are the same species which showed the worst responses to poor conditions in 1983. The 1983 El Niño appears to have had significant long-term consequences for Farallon seabird populations.

TERTIARY SEABIRD FAUNAS AND THE EVOLUTION OF MODERN CALIFORNIA SEABIRD COMMUNITIES

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The Tertiary fossil record of California seabirds (gaviiforms, podicipediforms, procellariiforms, larids, and alcids) can be divided into three distinct faunas. Within each fauna, ecological units (e.g., percent plungers vs. percent divers) are recognized. The record shows a decrease in percent plungers (sulids), and an increase in percent divers (alcids, cormorants, loons, and grebes). These trends are discussed in relation to changes in physical parameters (e.g., water temperature, degree of upwelling, salinity, etc.) during this time period. A scenario for the evolution of modern California seabird communities is presented.

VOCALIZATIONS, BEHAVIOR, AND COLONY ATTENDANCE OF ANCIENT MURRELETS

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Vocalizations and behavior of Ancient Murrelets (*Synthliboramphus antiquus*) were studied at Reef Island, Queen Charlotte Islands, British Columbia, in April, May, and June of 1984. Ancient Murrelets possess an unusually complex vocal repertoire, with structurally different signals associated with activities ranging from staging on the sea to fledging. A distinctive vocalization given at the colonies at night has the characteristics of "song." Songs are performed from perches in trees and from the ground near burrows. Songs are complex in structure and include individually stereotyped and variable sections. The birds respond to playback, and countersinging between birds is frequent. Vocalizations and activity are most intense during the prelaying and laying periods and again after fledging, when an influx of nonbreeders occurs. Ancient Murrelets may be invaluable for the study of avian vocalizations.

VARIABILITY IN ATTENDANCE PATTERNS OF NESTING AND NONNESTING KITTIWAKES IN PRINCE WILLIAM SOUND, ALASKA

Irons, D. B. U.S. Fish and Wildlife Service, 1011 E. Tudor Rd., Anchorage, AK 99503

Nest sites with and without chicks and roost sites were monitored for three weeks by time-lapse photography during incubation and chick rearing. Activity patterns (i.e., presence or absence) of kittiwakes were recorded for each site at five-minute intervals during daylight hours. Nest sites with chicks had one adult present at all times and rarely had two adults present. Nest sites with eggs had at least one adult present at most times and had two adults present for periods up to several hours. Use of roost sites was more erratic, with no adults and/or two adults present often. This information may enhance census techniques and relate colony attendance to reproductive success.

CRECHING BEHAVIOR IN THE BRANDT'S CORMORANT

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Creching behavior is well known among members of the order Pelecaniformes but has not been described hitherto in detail for the family Phalocrocoracidae. We studied creching in the Brandt's Cormorant on Southeast Farallon Island, California, in July and August 1984. We individually marked 149 chicks in three adjacent subcolonies with different nesting chronologies and monitored their daily movements up to and beyond fledging. Before chicks were left unattended, adjacent broods accumulated on nest sites. When unattended by parents during the day, up to 14 chicks remained in these "brood accumulations" but were often rousted from them by parents feeding chicks or individuals stealing nest material. Creches then formed just off nest sites. Later, up to 78 chicks creched farther from nest sites toward the water's edge. Chicks eventually joined nocturnal roosts but moved in groups back to subcolony areas in the day. Fledged chicks continued to occur in creches or roosts near the natal colony or elsewhere on the island. We consider brood accumulations and creches to have thermoregulatory and social functions during chick development in this species.

CHICK MORTALITY IN WESTERN GULLS: AGE AT DEATH, 1981-1983

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Three study plots were established on Southeast Farallon Island to monitor breeding activities of the Western Gull (*Larus occidentalis*) without disturbance. Daily observations throughout the breeding seasons of 1981-1983 allowed us to determine the date of death for chicks from each nest. Using an average date of hatch for each clutch, ages at death were calculated. Age at death of chicks varied significantly, not only between years but also between plots within years. The relative importance of timing, habitat, territory, and conspecific predation is discussed.

INTERGENERATIONAL CONFLICTS IN GULLS: DO CHEATERS PROSPER?

Pierotti, Raymond, and Edward Murphy. Ocean Research and Education Society; Institute of Arctic Biology, Univ. Alaska, Fairbanks, AK

Although it is well known that one of the major causes of mortality in gull chicks is attacks and cannabalism by conspecific adults, adoption and care of chicks by adults other than their parents is also common. Data from four species of gulls demonstrate that chicks receiving parental care of low quality will desert their parents and solicit either adoption or extraparental care. Evidence suggests that chicks of these species have evolved to be hard to recognize. This creates a situation where chicks may be cheating adults by soliciting care that will make no apparent contribution to the inclusive fitness of the adults. An analysis of the cost-benefit schedule of this interaction indicates that chicks should usually win because the benefit to the chick far outweighs the cost to the adult. Adults may win by killing any chick that they are not sure is not their own. Care of nonrelated offspring could be maintained in gull colonies either through a form of reciprocity, where adults exchange chicks over time, or through low-cost (soft) altruism through group selection. The observation that the frequency of nonparental chick care is more common in gull species that inhabit extreme environments supports this idea.

CHICK ADOPTION IN GULLS: WHO'S CHEATING WHOM?

Hebert, P. N. Zoology Dept., Univ. Manitoba, Winnipeg, MB R3T 2N2, Canada

Chick adoption has been observed in some gull species. Kin-selection, reciprocal altruism, and selfishness have all been invoked to explain adoption behavior. These arguments, however, imply a benefit to the foster parents, and the assumptions on which they are based do not agree with the evidence in the literature. Hence, it is hypothesized that chicks have evolved a cheating strategy, whereby under certain conditions, they seek adoption. Several predictions arise from this hypothesis: a) adults should always try to distinguish between their young and foreign young; b) chicks can behave "indiscriminately"; c) any benefit to the foster parents is incidental and not reciprocal; and d) chicks seeking adoption should do so in nests where they would be at least as large as the oldest resident chick.

POSTFLEDGING PARENTAL CARE IN SOME POPULATIONS OF WESTERN GULL

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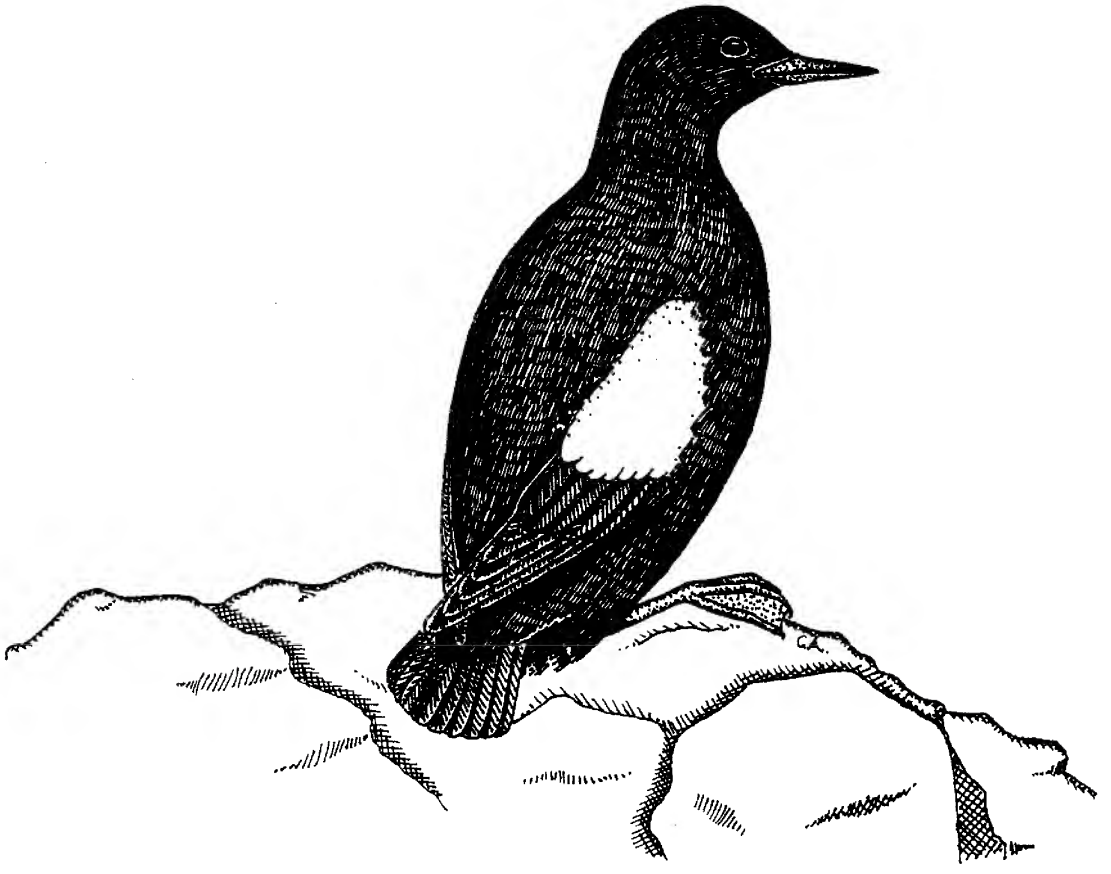
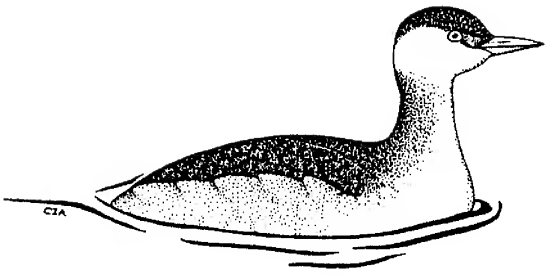
Postfledging parental care in an offshore colony of Western Gulls was examined by following the in-colony and postdispersing movements of individually marked adults and progeny. The results indicate that parental care by these gulls ceases when the young disperse from the island at about 70 days of age. Alternately, recent studies and observations made during this study suggest that parental care may be of longer duration in some mainland, or nearshore, Western Gull colonies. Extended periods of parental care were observed at locations where competition for food was minimal, where foraging territories and/or food items could be defended by parents, and where food sources were near to nest sites. The evidence indicates that instances of prolonged parental care in these gulls may result from the activities of well-adapted individuals that specialize in foraging techniques that facilitate extending their breeding efforts. Implications are discussed.

THE COST OF REPRODUCTION IN GLAUCOUS-WINGED GULLS

Reid, W. Dept. Zoology NJ-15, Univ. Washington, Seattle, WA

The low reproductive rates of marine birds can be attributed in part to the difficulty of obtaining sufficient food for large broods. A second factor of importance in the determination of reproductive rates in long-lived animals may involve the trade-off between allocation of resources to current reproduction and the expectation of future reproduction. If the raising of "extra" chicks results in even a slight decrease in adult survivorship or future fecundity, there will be strong selection against this increased effort. I attempted to measure this "cost of reproduction" by manipulating brood sizes of 291 banded adult gulls at 203 nests. Adults raising large broods weighed less at the end of the breeding season but showed no evidence of increased mortality or reduced fecundity in the following season. These results are interpreted not as an absence of an incremental cost of reproduction but rather as an indication that the cost is small and may be of little importance in the determination of gull clutch size.





TENTH ANNIVERSARY MEETING KEYNOTE ADDRESS

Keynote Address by Dr. J. Michael Scott, U.S. Fish and Wildlife Service, at the Tenth Anniversary Meeting of the Pacific Seabird Group held 6-10 January 1984 at Asilomar, California

I consider it a privilege and pleasure to address this, the tenth meeting of the Pacific Seabird Group. I have divided my talk into three parts. In the first I will give details as to how and why the group was formed and tell you about some of those who played major roles in its formation. In the second part I will provide you with my impression of what PSG has done since the first meeting in 1974. Finally I will discuss the future of PSG and make some suggestions on how it might move ahead.

The PSG had its beginnings in a seabird symposium convened at the December 1972 meeting of the Western Society of Naturalists. The objective of the symposium was to increase the flow of information among a growing group of seabird researchers who all felt they were ill-informed about each other's activities. I sent out invitations to approximately 50 people asking them to present a paper; 21 responded, too many for the time allocated for the symposium. We spilled over into the general paper session.

Following the last paper presented at the symposium, Jim Bartonek, U.S. Fish and Wildlife Service, asked that those interested in forming a seabird group meet to discuss the needs and possibilities for such a group. It was an idea that he and James King thought worthy of suggesting to that group of ornithologists and marine biologists who had a biased interest towards seabirds. Among those attending that meeting were Spencer Sealy, George Divoky, Jim Bartonek, Charles Yocom, Martin Cody, George Hunt, and myself. We decided that there were probably enough people interested in seabirds to justify such a group and perhaps the best way to find out what its goals and objectives should be was to send out a questionnaire. George Divoky, under the guidance of Jim Bartonek, assumed that responsibility. The results of that mailing were reported in the first issue of the PSG Bulletin. A seabird catalog and promotion of uniform and effective census techniques were the top vote getters. Response to the questionnaire indicated enough interest in a seabird group to justify forming an interim executive council. This council met in the Fall of 1973 at Point Reyes Bird Observatory. At that meeting a great deal of time was spent discussing the goals and geographical scope of the group. We concluded then that a group focusing on seabirds in a single ecosystem would be the most effective means to further the objectives of the group. The objectives of PSG were then, as they are now, "to coordinate and stimulate field activities of its members and to inform its membership and the general public of conservation issues relating to Pacific seabirds and the marine environment."

In the period between the seabird symposium in Arcata and our first meeting in Seattle, much work was done to ensure successful launching of the PSG. Individuals who played major roles include Gene Knoder, of the National Audubon Society, who obtained financial support needed to publish our first bulletin. Jim Bartonek provided behind-the-scenes leadership and funding and support for the early issues of the Bulletin. George Divoky did much of the work of getting the Bulletin together and the mailing of the questionnaire. Timothy Myers, Spencer Sealy, Dan Anderson, and Gerry Sanger were sources of enthusiasm and ideas during these early stages. Financial support was provided by National Audubon Society and Northern Prairie Wildlife Research Center.

The first annual meeting was held at Seattle in December 1974 at a nunnery, a never-to-be-forgotten locale. Seventy-five people paid to attend that meeting, and approximately 50 others took potluck. Thirty papers were presented. Spencer Sealy and Miklos Udvardy co-chaired a symposium on the Biology of the Alcids. Since that first symposium, nine symposia and three workshops have been held at PSG meetings. Topics covered include shorebirds, kittiwakes, tropical birds, investigator bias, conservation in California, among others. The proceedings of one of these—the shorebird symposium—has been published, and it is my understanding that the proceedings of the tropical bird symposium is at the press, whereas that of the 1981 symposium at Seattle will appear in 1984.

The number of papers presented at your annual meeting has averaged 41 and ranged from 19 at the Tucson meeting (could this have been related to the inland location?) to 52 presented at your 1981 meeting in Seattle. I have summarized the species and general topics covered in these papers and found that you are really into breeding, feeding, and travel. Taxonomic, morphological, methodological and behavioral studies take a back seat, with fewer than 15 in all these categories in each of the 5-year periods I examined. From 1974 to 1978 the greatest number of papers (15) dealt with Western Gulls. I was surprised at the general paucity of papers presented on the smaller North Pacific alcids and endangered seabirds.

During the 10 years of PSG's existence, you have had 8 chairmen. Two have served consecutive terms and a third, Dan Anderson, is your current Chairman-Elect. While they all brought different strengths and perspectives to that position, all repeatedly stated that the strength of PSG lay in its members, and they actively sought your ideas and suggestions as to how they should proceed. I know of no other group leadership that so actively seeks membership input.

Since publication of its first Bulletin, the membership of the PSG has increased from 80 to over 400. However, I learned only last night that 259 have not paid their dues. No dues is one way to keep membership high.

Conservation is a topic that always generates a lot of interest. It was stated in the first issue of the Bulletin that one of the major goals of the PSG will be to inform members of and act upon conservation issues relating to seabirds. It was further stated that "conservation notes will be regularly reported in the regional reports and more detailed articles will also be presented in the Bulletin." When an issue is of major importance, the PSG will issue a policy statement. Policy statements are intended to inform organizations and individuals of critical situations involving seabird conservation and will present the PSG's recommendations for dealing with the problem. I went to the back issues of the Bulletin to see how well you have done in

meeting this objective of PSG. I found that the Executive Council has issued 5 resolutions dealing with the conservation of seabirds while regional representatives reported on 50 conservation topics. Forty-one of these were reported on during the period 1974-1978.

The follow-ups on the gillnet policy statements I found very helpful. It would have been informative to have had similar follow-ups on other resolutions.

While we never intended that PSG be a conservation group along the lines of the National Audubon Society or the Nature Conservancy, I think a better job can be done to ensure that these groups get the information needed to take action to protect seabirds. The local and state representatives of government and private conservation groups can be informed of threats to seabird populations. PSG needs to provide a reliable and consistent link between its members who have data and the groups in a position to act on those data.

Many people have expressed the opinion that PSG is different from other scientific organizations. Is this true? I believe that it is and primarily because PSG is small enough that strong personal and professional ties exist among many of us and we are working on very closely related problems.

I agree with Dan Anderson, who stated that the three real strengths of the PSG are (1) the PSG Bulletin, (2) our annual meeting, and (3) an interested and active membership. B. Bourne of the Seabird Group sees PSG differing from the British group in that we guard our independence and take a much stronger line on conservation issues.

After ten years PSG is coming of age. I believe that it is time to more narrowly define your sphere of interests and build on your strengths. While your membership has increased four- to fivefold, the number of papers presented at your annual meeting has increased only by 50%. This may be an index of what percentage of your membership is actively involved in seabird work. It is that active membership for which PSG was originally organized! It is important to remember who your constituents are.

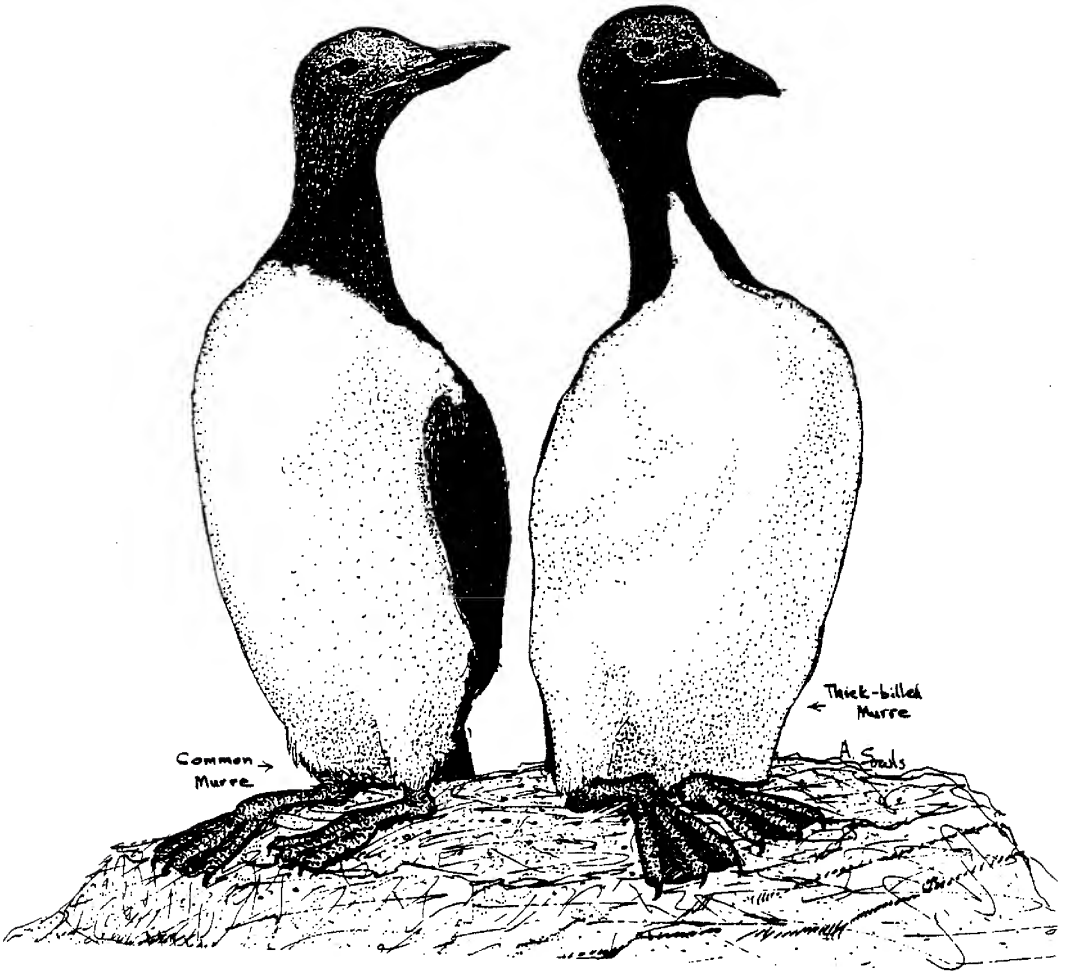
As indicated earlier, perhaps the biggest strength of PSG is its annual meeting. Build on that. Stay away from concurrent sessions. Allow 20-30 minutes for paper presentations. Make certain that there is plenty of unstructured time for discussion; take 2-hour lunches and 20-minute coffee breaks. It is from the annual meeting that you draw your strength. It is in the paper session and informal discussions at your meetings that new ideas are generated and old ones challenged. It is there that threats to seabirds are identified and creative management solutions designed.

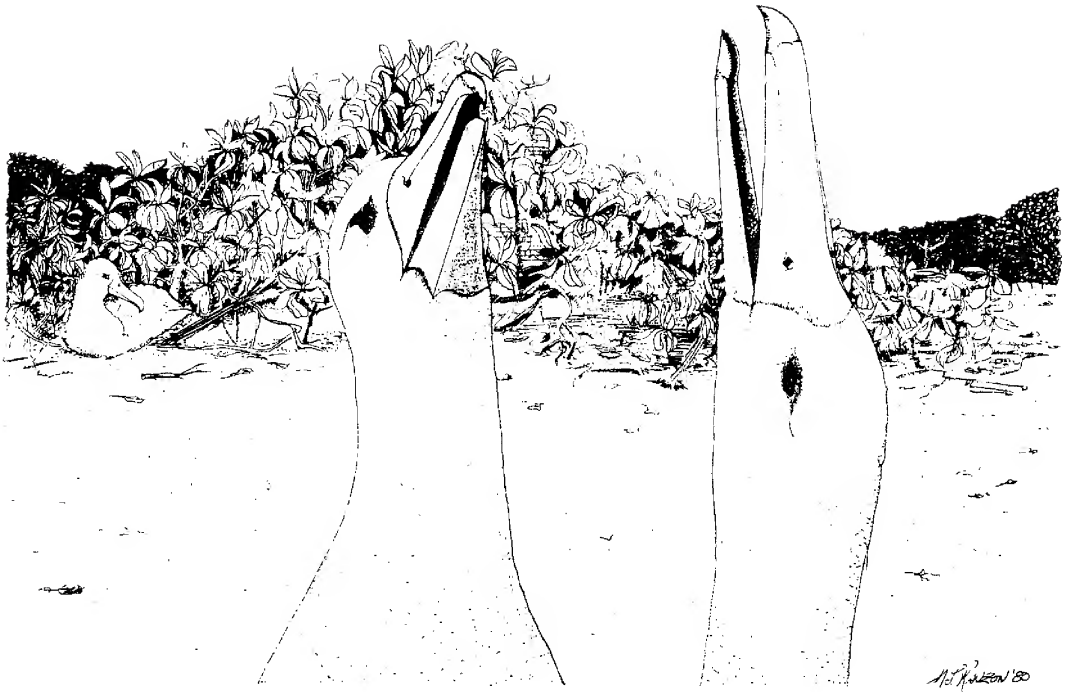
I would encourage organizers of your symposia to spend two to three years putting them together. There are some great possibilities: Dan Anderson's idea for a symposium on seabird conservation, Spencer Sealy's on Biology of the Alcidae, and Kees Vermeer's suggestion for a seaduck symposium, to name but a few. When seeking possible topics think in terms of generic problems or summary statements on taxa. Take a systems approach—estuarine, pelagic, coastal, pollution, conservation, etc.

Strengthen your ties with the other seabird groups by reporting their activities in the Bulletin and informing them of your own. Do this without giving up your identity. Let's work with the other seabird groups to gain the global perspective so badly needed while continuing to focus and act locally.

In conclusion, you, the members, are the strength of the PSG. I believe that because the group is small and composed of individuals who have strong personal and professional ties, who are willing and even eager to share ideas, that you have been successful. Protect that—it's your biggest asset!

Maintain that openness and willingness to share, and remember that your original officers and many of your original executive council were graduate students or only recently graduated. Don't ignore that talent pool. They are bright, enthusiastic, full of ideas, and they all have more hair than I do. Thanks for the opportunity to talk to you. I for one am quite pleased with what PSG has become, and I am very optimistic that it will continue to meet the objectives as we stated them in 1974.





BOOK REVIEWS

The Behavior of Penguins. 1984. D. Muller-Schwarze, State University of New York Press, Albany. 193 pp. + xii, 82 photos, 3 fig. $30.00

Except, perhaps, for raptors, ducks, and game birds, there is probably no group of wild birds about which so much has been written as penguins. They have been dealt with exhaustively in the popular, semipopular, and scientific press, as well as in countless productions of the visual media. Let's face it: even without such general volumes as Sparks and Soper's *Penguins* (1967), and Simpson's *Penguins: Past and Present, Here and There* (1976), and Stonehouse's *The Biology of Penguins* (1975), penguins are well known to many people. Thus, to take us successfully beyond the superficial familiarity that most of us have with this group is a challenge requiring an exceeding amount of time, effort, and scholarship. I had in mind that a volume like Nelson's *The Sulidae* would do it. With these thoughts, as well as knowing that the author had worked with penguins for a decade and had led nature tours among them for an additional 10-year period, and thus was among the few people who could succeed in the task, I had looked to the appearance of the present volume with much anticipation. Adding to my excitement was the fact that this book had been edited, as part of the "SUNY Series in Animal Behavior," by Jerram L. Brown, a scientist whose contributions had reshaped the study of animal behavior.

Simply stated, although the book got off to an auspicious start, I was disappointed in the end. The message in the Preface, that Antarctica is on the brink of much trouble, needs to be said again and again, but the information contained in the remainder of the book has already been presented to us too many times.

Part I, *Penguins in General*, was well enough done, presenting information that most readers probably already know, but done in a way that has not been done before in the semipopular press—namely, by leading the reader to appreciate the marine nature of these birds by including such topics as "Penguins as Diving Birds" and "The Role of Penguins in Their Ecosystem." Although *The Behavior of Penguins* is subtitled "Adapted to Ice and Tropics," the author does not take us much beyond the Antarctic, even though the largest group of penguin species, as he notes, lives in the subantarctic region and the second-largest group lives in subtropical and tropical latitudes.

Part II, *The Penguin Species*, begins with an adequate summary of that best-known of all penguins, the Adélie. The section highlights the author's main work on penguins, which has concerned the predator-prey relationships involving the Adélie Penguin. This emphasis, which he does not note, is important because penguins are unique among seabirds in that predation pressure (exerted mostly by pinnipeds) is a significant factor in their population dynamics. The remainder of Part II consists of eight exceedingly superficial treatments of other penguin species or penguin groups and of comparative penguin behavior; it thus ignores a voluminous store of available information. Though the life history of the Adélie was presented in about 26 pages of text, that of the Chinstrap was presented in only 3 pages, the Gentoo in 2.5, the Emperor in 3, the King in 3, crested (6 spp.) in 8, banded (4 spp.) in 4, fairy (2 spp.) in 2.5, and Yellow-eyed in 1! To essentially ignore the last species, itself the subject of a monograph and two books, one of which is a classic in the zoological literature (L. E. Richdale's *A Population Study of Penguins*), is unforgivable in a book such as the present one. At the least, Muller-Schwarze could have picked one warm-water species to present with as much detail as he did the Adélie. Another measure of the superficiality of the presentation is the ratio of photographs to text. In Part I, there are 5 photos in 39 total pages, in the Adélie section of Part II, there are 31 photos in 50 pages, and in the remainder of Part II, 46 photos in 83 pages.

So, if you want some photos of penguins, this book (among many) is for you; if you want a good summary of our present knowledge about penguins, it does not exist, but do not despair. You will not be disappointed in the sections on penguins in *The Dictionary of Birds*, a volume scheduled to appear shortly. Also, in that I had too many expectations, I was perhaps not the person to review this book. Be sure to look for other reviews.-David G. Ainley, Point Reyes Bird Observatory

Breeding biology of the Adélie Penguin. 1983. D. G. Ainley, R. E. LeResche, and W. J. L. Sladen. Univ. California Press, Berkeley, California. 244 pp., 15 halftone plates. $27.50

Seabirds tend to be long-lived organisms whose lives are influenced by large-scale temporal and spatial variables. Long-term studies are thus highly appropriate to develop an understanding of the demography, feeding, and breeding biology of a seabird. This book presents some of the results of such a study undertaken over a 21-year period at Cape Crozier, Ross Sea, Antarctica. The authors generated an impressive data set including observations of 4485 banded birds of known age, usually sexed, totalling 7860 bird seasons.

It is a commonly accepted paradigm that the breeding success of a seabird improves with the bird's age. The effects of age, however, include a range of interrelated determinants including physiological maturity; experience at sea, which affects foraging success and avoidance of predators; and experience at the breeding colony, which affects the bird's ability to attain a nest site and mate and otherwise "manage" its social environment. The heart of this book is an attempt, gen-

erally successful, to tease apart the effects of age, sex, and rookery experience as they pertain to prebreeding and breeding activities in this penguin.

Adélie Penguins return to the rookeries for the first time when two to four years old, and breed for the first time when five to six years old. Prebreeding birds spend much time at the rookery wandering, usually centered around areas where they subsequently nest. They also establish temporary nesting territories and keep company with birds of the opposite sex. The age of a bird and its previous rookery experience affect the type and frequency of prebreeding behaviors, but beyond the first year, the effects of experience are usually negligible. Young birds evidently need to learn the social skills needed at the rookery for successful breeding.

Nearly every facet of the Adélie Penguin's breeding was found to be affected by age. The factors where age seemed to have the greatest effect on breeding success were body weight and the amount of subdermal fat upon arrival, which affected the time an adult could spend at the rookery; facility of social interactions, egg loss; the proportion of infertile eggs, nestling survival prior to the creche stage; fledging success; and the weight of fledglings. Many of these age-related changes could be explained by rookery and breeding experience. In most cases only one or sometimes two years of breeding experience, but no more, increased breeding success. Some changes, such as egg fertility, could be related to age-related physiological changes.

Experience at sea, particularly proficiency at foraging and avoiding predators (leopard seals), appears to affect several aspects of breeding as well as adult survival. The role of this experience at sea is more difficult to analyze than the effects of rookery experience. Regrettably, the effects of parental age on the size and frequency of chick-meals, which should reflect the adult's feeding proficiency, are not fully analyzed. Readers are referred to an earlier paper by Ainley and Schlatter and to "indirect measurements" which are never fully explained.

The Adélies at Cape Crozier have one of the most restricted breeding seasons of any seabird, a consequence of the latitude (77°S) and restrictions of sea ice. There is thus a premium on synchrony in the breeding efforts of a pair that overrides the advantages of retaining pair bonds from year to year. Asynchronous arrivals at the start of the season often end pair bonds, particularly among younger birds. Strong wind, which removes the sea ice adjacent to the rookery and thus facilitates commuting to foraging areas, is the most important environmental variable affecting breeding at this site.

Commendably, the authors analyze the effects of their research methods on their subjects. Disturbances by researchers did not appear to affect breeding success greatly, but did reduce recruitment of young birds to colonies near the research station. Banded birds had lower survival rates than nonbanded cohorts in the same rookery. Penguin flipper bands seem to cause more problems than the conventional leg bands used on other seabirds.

Finally, the data are used for a demographic analysis. One major conclusion is that the Cape Crozier population of Adélie Penguins is declining, and the authors look to changes in the marine environment of the Ross Sea for possible explanations. The adaptiveness of the species' life history is discussed at length. Unlike most other seabirds, these penguins are not at the top of their food web, and breeding adults are subject to high mortality (11%), which curtails their reproductive lifespan. Despite this, breeding is delayed for up to seven years. The authors argue that breed-

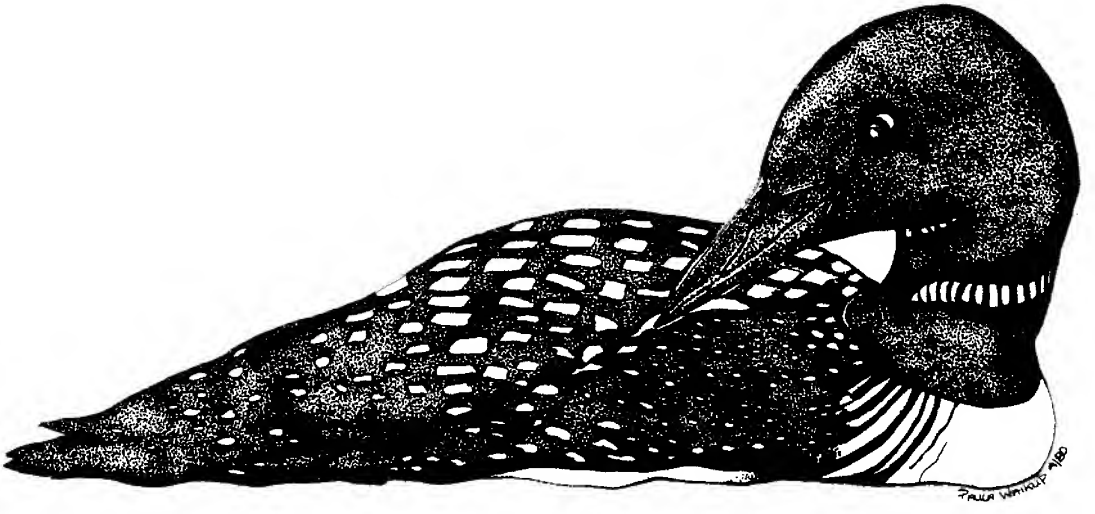
ing is a difficult accomplishment for an Adélie Penguin. Young birds require a few years to develop feeding efficiency to the point where they can visit the rookery, and additional years of experience to be able to avoid predators and find sufficient food to rear chicks. At least one year of rookery experience is also needed before breeding.

A useful spin-off from the demographic analysis is the provision of the population's age structure. This should allow more accurate interpretation of censuses, which are usually restricted to breeding pairs.

I was unhappy at times with the statistical procedures used. The choice of statistical tests is never discussed, and, with very few exceptions, linear regressions and t-tests are used throughout. In many cases the data do not appear to meet the requirements for t-tests (normality, similar variances, etc.), and non-parametric tests seem more appropriate. Regressions are used in cases where there are only three or four independent variables. In one such case (Table 7.27) the regressions were either incorrectly interpreted (p. 144) or were shown incorrectly to be negative, and when I tried a chi-square test using the data as a 3x3 contingency table, I reached a different conclusion regarding the effects of experience on the number of chicks fledged. Researchers using these data for comparative purposes should check the statistics first. Fortunately, the data are presented in suitable detail to do that.

A book should not be an overgrown journal paper, but unfortunately this one is. I found myself missing the atmosphere and color of a seabird rookery that some authors, notably Nelson, manage to serve up along with the hard facts in the more relaxed atmosphere of a book. The fault here is that one has to chew through huge numbers of rather dry tables, 103 in all, to assimilate the data. These tables will no doubt be fertile foraging grounds for population biologists seeking comparative material, but many seabird biologists will be content to browse through the well-prepared chapter summaries.

Ainley, LeResche, and Sladen join a select group of seabird biologists who have published results of long-term studies using birds of known age. It is disturbing to note how few of these studies were based in North America. Do the three- to four-year studies most of us undertake really reveal the true nature of long-lived seabirds?-Alan E. Burger, Department of Biology and Newfoundland Institute of Cold Ocean Science, Memorial University, Corner Brook, Newfoundland A2H 6P9, Canada.



Common Puffin

(Fratercula arctica)